

### REMARKS/ARGUMENT

Claims 1-20 are pending in this application. Claims 1-20 stand rejected. In light of the amendments and remarks set forth below, Applicant respectfully submits that each of the pending claims is in immediate condition for allowance. The Amendments are made to clearly claim the invention and in no way narrow the scope of the claims.

Claims 1, 3, 10, and 12 are rejected under 35 U.S.C. § 102 in light of U.S. Patent No. 6,283,568 ("Horii"). Applicant respectfully requests reconsideration and withdrawal of this rejection.

To anticipate a claim under 35 U.S.C. § 102, the cited reference must disclose every element of the claim, as arranged in the claim, and in sufficient detail to enable one skilled in the art to make and use the anticipated subject matter. See, PPG Industries, Inc. v. Guardian Industries Corp., 75 F.3d 1558, 1566 (Fed. Cir. 1996); C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1349 (Fed. Cir. 1998). A reference that does not expressly disclose all of the elements of a claimed invention cannot anticipate unless all of the undisclosed elements are inherently present in the reference. See, Continental Can Co. USA v. Monsanto Co., 942 F.2d 1264, 1268 (Fed. Cir. 1991).

The present invention relates to an ink jet printer with high printing quality. The present claims are allowable over the cited references as it is different in terms of structure and effects as discussed below.

In the present invention, the diameter of a dot is increased by exchanging sets of drive waveforms on each successive scan. There are a plurality of waveform generating means and the waveform can be changed on every scan. A single dot is created from each wave generating circuit according to the waveform generated by the waveform generating circuit. It should be noted that each dot is formed by a waveform generated by the waveform generating circuit from data stored in the drive waveform storage means. Thus, each dot is formed from a uniquely generated complete waveform. Further, as explicitly recited in Applicant's claim, the present invention chooses one waveform or no waveform to be output. When no drive waveform is applied to the piezoelectric actuator, a blank pixel is created. By scanning the same line more than two times, and exchanging waveforms, printing with a plurality of grey scales can be accomplished. For example, three wave generating circuits scanned two times make six different kinds of dots, without any banding.

In contrast, in Horii, the diameter of the dot is increased by time division, i.e., outputting a group of waveform signals and choosing segments of each signal in preset time intervals. While there are a plurality of waveform generating means, there is no ability to change the waveform. One dot is created from each of the wave generating circuits according to the waveform portions that are selected. A fixed number of waveforms are output during each scan. Each standard waveform is then divided into time segments. Each segment is then applied to a piezoelectric actuator. According to the way the waveform is divided, many types of dots can be formed so there is not a potential banding portion. For

example, three waveforms and time changeovers make nine distinct dots. However, a large volume of data must be handled thereby increasing the cost. Additionally, the variety of voltages at the connections between the waveform generating circuit and the piezoelectric actuator can cause damage to the piezoelectric actuator.

In U.S. Patent No. 6,293,643 ("Shimada"), the diameter of the dots is changed using combinations of the density of the dots' diameter to eliminate banding. There is a single waveform generating means and there is no change of waveform possible. A plurality of droplets are generated from one wave generating circuit according to a compound waveform. Each specific waveform is chosen by on/off switching the chosen waveform which is repeated during a printing period. Thus, banding is avoided by changing the various size of the dots.

U.S. Patent No. 6,338,542 ("Fujimori") increases the diameter of a dot by periodically changing the waveform. There is a single waveform generating means and the waveform can be changed during every printing period. A plurality of drops are generated from one wave generating circuit according to a compound waveform. As in Shimada, on/off switching of the chosen waveform is repeated during the printing period to choose a waveform. Thus, the waveform is changed during every printing period requiring a fast transaction system which is very expensive. In Fujimori, changeover of the compound waveforms generates three dots in every period, allowing for six different kinds of dots.

Thus, as can be seen in the above, the present invention is different from the other references in that the diameter of each dot being printing is varied by exchanging sets of drive waveforms on each scan. This is unlike all of the other references that require variations in the time division of the waveform or by changing combinations of the density of each dot's diameter.

As explicitly recited in claims 1 and 10, the drive waveform signals are selected and generated at the time of said scanning so that dots with a plurality of grey scales are generated. As discussed above, this is unlike any of the cited references, and is not disclosed or taught in the cited references. Thus, whether taken alone or in combination, the cited references fail to disclose Applicant's explicitly claimed invention and the rejections to those claims should be allowed.

Claims 3-9 depend from, and contain all the limitations of claim 1. These dependent claims also recite additional limitations which, in combination with the limitations of claim 1, are neither disclosed nor suggested by the prior art and are also believed to be directed towards the patentable subject matter. Thus, claims 3-9 should also be allowed.

Claims 12-20 depend from, and contain all the limitations of claim 10. These dependent claims also recite additional limitations which, in combination with the limitations of claim 10, are neither disclosed nor suggested by the prior art and are also believed to be directed towards the patentable subject matter. Thus, claims 12-20 should also be allowed.

Claims 2 and 11 have been rewritten in independent form and are allowable for the reasons above, as well as those discussed below.

Claims 2, 4-7, 11, and 13-17 stand rejected under 35 U.S.C. § 103(a) over Horii in view of Shimada. Applicant requests reconsideration and withdrawal of this rejection.

To properly reject the Applicant's claims for obviousness in view of a combination of prior art references, the Office Action must establish that a person of ordinary skill in the art would have been motivated to combine the cited references and, in combining them, would have arrived at the invention claimed by the Applicant. In re Kotzab, 208 F.3d 1365, 1370 (Fed. Cir. 2000). A motivation to combine may arise from: (i) either explicit or implicit statements in the prior art references themselves; (ii) the knowledge of those of ordinary skill in the art that certain references, or disclosures in those references, are of special interest or importance in the field; or (iii) the nature of the problem to be solved. Ruiz v. A.B. Chance Co., 234 F.3d 654, 665 (Fed. Cir. 2000).

Regardless of its source, or the form that it takes, a motivation to combine must be clearly and particularly shown. In re Dembiczak, 175 F.3d 994, 999-1000 (Fed. Cir. 1999). The Federal Circuit has held that a motivation to combine is not shown by the mere assertion that the claimed invention would have been obvious to one of ordinary skill in the art simply because it is a combination of elements that were known at the time of the invention:

[T]here is no basis for concluding that an invention would have been obvious solely because it is a combination of elements that were known in the art at the time of the invention. See Fromson v. Advance Offset Plate, Inc., 755 F.2d 1549, 1556, 225 USPQ 26, 31 (Fed.Cir.1985). Instead, the relevant inquiry is whether there is a reason, suggestion, or motivation in the prior art that would lead one of ordinary skill in the art to combine the references, and that would also suggest a reasonable likelihood of success. See, e.g., In re Dow Chem. Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531-32 (Fed.Cir.1988).

Smiths Indus. Medical Systems Inc. v. Vital Signs, Inc., 183 F.3d 1347, 1356 (Fed. Cir. 1999); see also In re Dembiczak, 175 F.3d at 999-1000 (Fed. Cir. 1999).

The Office Action's sole justification for combining Horii and Shimada is precisely the sort of assertion that the Federal Circuit rejected in Smith. The Office Action argues that one of skill in the art would have to modify the method and apparatus of Horii to reflect the method and apparatus disclosed in Shimada, because the "technique effectively utilize[es] at least two different types of dots having different ink densities and different ink weights for preventing banding...." See Office Action, at 6. This assertion, however, is merely conclusory. Further, Horii allows for multiple dots to be formed using various waveforms, which will prevent banding so there is no motivation to modify Horii in view of Shimada. Horii itself prevents banding thus performs all of the necessary requirements of Shimada to prevent banding other than printing a dot in the same place twice. Therefore, there is no reason to modify Horii in light of Shimada.

In summary, the Office Action fails to establish with clarity and particularity that a person of ordinary skill in the art would be motivated to change the arrangement of

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components disclosed in Horii in light of Shimada. As a result, the Applicant respectfully submits that the Office Action fails to establish a *prima facie* case of obviousness with respect to claims 2, 4-7, 11, and 11-17, and that the objection to those claims under Section 103 should be withdrawn.

Applicant has responded to all of the rejections and objections recited in the Office Action. Reconsideration and a Notice of Allowance for all of the pending claims are therefore respectfully requested.

It is asserted that the present amendment places the application in a form for allowance. Entry of this amendment is therefore earnestly solicited.

If the Examiner believes an interview would be of assistance, the Examiner is welcome to contact the undersigned at the number listed below.

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Respectfully submitted,

By

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